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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Reallocation of the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands; and	)	ET Docket No. 00-221 RM-9267 RM-9692 RM-9797 RM-9854
	)	
Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service; and	)	ET Docket No. 99-255 PR Docket No. 92-235
	)	
Amendments to Part 90 of the Commission's Rules Concerning Private Land Mobile Radio Services	)	WT Docket No. 97-153

REPORT AND ORDER AND MEMORANDUM OPINION AND ORDER

Adopted: December 21, 2001 **Released: January 2, 2002**

By the Commission:

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I. INTRODUCTION

1. By this action, we allocate 27 megahertz of spectrum from the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz bands for non-Government use, thereby effectuating the transfer of this spectrum from the Federal Government pursuant to statutory requirements.[1] As discussed in the *Notice of Proposed Rule Making* for this proceeding (*Notice*),[2] these seven frequency bands are being transferred pursuant to the provisions of the Omnibus Budget Reconciliation Act of 1993 (OBRA-93)[3] and the Balanced Budget Act of 1997 (BBA-97).[4] This action continues the implementation of the Commission's November 1999 *Spectrum Policy Statement*, which identified a preliminary allocation plan for this spectrum, and articulated goals for efficient spectrum management.[5] Within that framework, our actions here fulfill our statutory obligation to reallocate this transfer spectrum to non-Government users. We believe that the actions taken herein, coupled with a companion Notice of Proposed Rule Making seeking comment on appropriate service rules for the reallocated frequency bands,[6] will lead to the development of new technologies and services and provide spectrum alternatives for users currently operating on heavily encumbered spectrum where operations are constrained due to congestion.

II. EXECUTIVE SUMMARY

2. Upon consideration of the record, we are taking the following major actions in this Report and Order:

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[1] The use of spectrum by Federal agencies is regulated by the National Telecommunications and Information Administration (NTIA) under the Department of Commerce. Non-Government spectrum use, which is regulated by the Federal Communications Commission (FCC or Commission) refers to all other spectrum use, including use by state and local governments, businesses, and individuals.

[2] *See* Reallocation of the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands, ET Docket No. 00-221, *Notice of Proposed Rule Making*, 15 FCC Rcd 22657 (2000).

[3] *See* Pub. L. 103-66, 107 Stat. 312 (1993).

[4] *See* Pub. L. 105-33, 111 Stat. 251 (1997).

[5] *See* Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, FCC 99-354, *Policy Statement*, 14 FCC Rcd 19868 (1999) (*Spectrum Policy Statement*) at ¶ 21. *See also*, para. 11, *infra*.

[6] We will issue a Notice of Proposed Rule Making addressing service rules consistent with the allocation decisions being made herein (Service Rule Notice).

- Allocating the 216-220 MHz band to the fixed and mobile (except aeronautical mobile) services[7] on a co-primary basis. This action elevates the Low Power Radio Service (LPRS) from secondary to primary status in the 216-217 MHz band and provides existing licensees in the Automated Maritime Telecommunication System (AMTS) with additional flexibility, but does not alter the status of the 218-219 Service, which already operates on a primary basis in this spectrum.

- Allocating the 1390-1392 MHz band to the fixed-satellite service (Earth-to-space) and the 1430-1432 MHz band to the fixed-satellite service (space-to-Earth) on a primary basis. The use of these allocations will be limited to feeder links for NVNG MSS systems (Little LEOs) and is contingent on the adoption of a similar international allocation.

- Additionally allocating the 1390-1392 MHz band to the fixed and mobile (except aeronautical mobile) services on a co-primary basis, having determined that these services can successfully share spectrum with the Little LEO feeder uplinks. This band will be available on an unpaired basis.

- Shifting the Wireless Medical Telemetry Service (WMTS) allocation from 1429-1432 MHz to 1427-1429.5 MHz and maintaining the secondary status of non-medical telemetry systems in this band. Elevating telemetry to primary status in the 1429.5-1432 MHz band.

- Allocating the 1392-1395 MHz band and the 1432-1435 MHz band to the fixed and mobile (except aeronautical mobile) services on a co-primary basis. These bands will be available on a paired basis.

- Allocating the 1670-1675 band to the fixed and mobile (except aeronautical mobile) services on a co-primary basis and the 2385-2390 MHz band to the fixed and mobile services on a co-primary basis. These bands will be available on an unpaired basis.

- Deleting the primary Federal Government allocations in the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz bands, except as specified in footnotes US229, US352, US361, US362, and US363.[8]

3. The 1390-1395 MHz, 1427-1429 MHz, and 2385-2390 MHz bands are being allocated for exclusive non-Federal Government use, while the 216-220 MHz, 1432-1435 MHz, and 1670-1675 MHz bands are being allocated for mixed use.[9] In a separate proceeding, we effectuated the transfer of the 1429-1432 MHz band from shared use to exclusive non-Federal Government use, allocated it to the land mobile service, limited the use of this allocation to medical telemetry and telecommand operations, and established WMTS.[10] In this proceeding, we are modifying the allocation

[7] The mobile service includes the land mobile, maritime mobile, and aeronautical mobiles services. In contrast, the mobile except aeronautical mobile service includes only the land mobile and maritime mobile services.

[8] Consistent with our previous WMTS decision, we are allocating the 1427-1429.5 MHz band to the WMTS for Federal Government use.

[9] In the United States, radio spectrum may be allocated for exclusive Federal Government use, exclusive non-Federal Government use, or shared use. *See* 47 C.F.R. § 2.105(b). Mixed use is a type of shared use whereby Federal Government use is limited by geographic area, by time, or by other means so as to guarantee that the potential use by Federal Government stations is substantially less than the potential use to be made by non-Federal Government stations. *See* OBRA-93 at § 113(b)(2)(B). *See also* 47 U.S.C. § 923(b)(2)(B).

[10] *See* Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service, ET Docket 99-255, PR Docket 92-235, *Report and Order*, FCC 00-211, 15 FCC Rcd 11,206 (2000). WMTS is a low power service in which equipment is used in hospitals and health care facilities to transmit patient (continued....)

of the 1429-1432 MHz band. Thus, a total of 27 megahertz of Government-transfer spectrum is considered in this proceeding.

4. All primary Federal Government allocations are being deleted from the transfer bands, except in the mixed-use bands, where a limited number of stations will be grandfathered indefinitely.[11] Federal agencies will not add new primary stations in any of the transfer bands. In the bands 1432-1435 MHz and 2385-2390 MHz, non-grandfathered Federal Governments stations will retain their primary status until relocated in accordance with the Strom Thurmond National Defense Authorization Act of Fiscal Year 1999 (NDAA-99).[12]

5. In this proceeding, we deny two pending petitions for reconsideration of the WMTS allocation.[13] These petitions seek reconsideration of our decision to allocate the 1429-1432 MHz band for WMTS rather than for non-voice, non-geostationary mobile-satellite service (NVNG MSS; generally known as Little LEOs[14]) feeder downlinks.[15] In this connection, we note that satellite entities have been trying for several years to obtain a worldwide allocation for Little LEO feeder links in the 1429-1432 MHz band.[16] We are however, providing Little LEOs with access to four megahertz of spectrum (two megahertz of uplink and two megahertz of downlink) contingent on the United States obtaining an international allocation. While this action does not grant the Little LEOs what they requested in their petitions, we believe that it provides an opportunity for them to expand capacity, which is the stated intent of their proposal.

6. Because the 216-220 MHz band is considered for reallocation in this proceeding, we are addressing an issue that remains pending from the *Notice of Proposed Rule Making* in WT Docket No. 97-153 and terminating that proceeding.[17] That proceeding addressed several issues regarding the Private

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measurement data, such as pulse and respiration rates to a nearby receiver, permitting greater patient mobility and increased comfort. The bands 608-614 MHz and 1395-1400 MHz are also available for WMTS use. In that proceeding, we decided to permit Federal agencies, such as the Department of Veterans Affairs, to have access to the WMTS bands, including the exclusive non-Federal Government bands 1395-1400 MHz and 1429-1432 MHz.

[11] In the exclusive non-Federal Government bands (1390-1395 MHz, 1427-1429 MHz, and 2385-2390 MHz), we temporarily grandfather a limited number of sites.

[12] *See* Pub. L.105-261, 112 Stat. 1920, § 1064(c)(3) (codified at 47 U.S.C. § 923(c)(3)(B)). While the band 216-220 MHz is covered by NDAA-99, all primary Federal Government stations in this band are being grandfathered.

[13] *See* para. 59, *infra.*

[14] Little LEO satellite systems are generally small, low-Earth orbit (LEO) satellites that provide data messaging services on frequencies below 1 GHz. *See* 47 C.F.R. § 25.142.

[15] A feeder link is a radio link from a fixed Earth station to a satellite (uplink) or from a satellite to a fixed Earth station (downlink). These links are used for data backhaul, satellite control functions, and to connect satellite systems to other networks, such as the public switched telephone network (PSTN). *See* 47 C.F.R. § 2.1.

[16] Since the 1995 World Radiocommunication Conference, the United States has performed studies on sharing between space and terrestrial services and feeder links near 1.4 GHz for Non-Geostationary Orbiting Mobile Satellite Service (Little LEO) systems with service links below 1 GHz. See *WRC 97 Final Acts*, Resolution 127, note (d).

[17] *See* Amendments to Part 90 of the Commission's Rules Concerning Private Land Mobile Radio Services, WT Docket No. 97-153, *Notice of Proposed Rule Making*, 12 FCC Rcd 13468 (1997) (*Part 90 Notice*). The Commission previously addressed other aspects of the *Part 90 Notice* in a 1999 Report and Order. Amendments to (continued....)

Land Mobile Radio Service (PLMRS) rules, including the possibility of limiting telemetry operations in the 216-220 MHz band to only the 217-220 MHz band.[18] Limiting telemetry operations in this way was explored as a means of protecting operations of LPRS, which operates in the 216-217 MHz band.[19]

7. In a separate, but related proceeding we plan to adopt rules and procedures to implement certain provisions of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (NDAA-99) which requires non-Governmental entities to reimburse Governmental entities for the marginal relocation costs associated with moving their operations to other spectrum bands.[20] At that time, we also plan to issue a Further Notice of Proposed Rule Making seeking additional comment to supplement the record for that proceeding. While proposals for implementation of NDAA-99 were made in the *Notice* for this proceeding, we believe that the broad issues and general procedures that will be part of our competitive bidding procedures merit consideration in a separate proceeding. In addition, our implementation of NDAA-99 is heavily dependent on procedures being promulgated by National Telecommunications and Information Administration (NTIA), which have not yet been released. Of the seven frequency bands subject to this proceeding, the 216-220 MHz, 1432-1435 MHz, and 2385-2390 MHz bands are subject to the provisions of NDAA-99.

III. BACKGROUND

8. In OBRA-93, the Congress directed the Secretary of Commerce to identify at least 200 megahertz of Federal Government primary spectrum below 5 GHz for transfer to non-Federal Government services.[21] To guide this process, the Congress stated that the identified spectrum not be required for the present or identifiable future needs of the Federal Government.[22] Further, the Commission was directed to allocate 50 megahertz of such spectrum within 18 months of the issuance of a report by the Secretary of Commerce and to allocate most of the remainder over a 10-year period while reserving a portion for allocation after that period.[23] As a result of this requirement, the NTIA identified 235 megahertz of Federal Government spectrum for transfer to non-Federal Government use, including the 1390-1395 MHz, 1427-1432 MHz, and 1670-1675 MHz bands.[24] OBRA-93 also gave the Commission the authority to resolve cases of mutually exclusive license applications by assigning licenses through competitive bidding in certain radio services.[25]

(Continued from previous page)
Part 90 of the Commission's Rules Concerning Private Land Mobile Radio Services, WT Docket No. 97-153, *Report and Order*, 14 FCC Rcd 3023 (1999).

[18] *See* 47 C.F.R. Part 90. *See also*, 47 C.F.R. § 90.259.

[19] *See* paras. 16and 23-25, *supra*, for a description of the LPRS.

[20] *See* Pub. L.105-261, 112 Stat. 1920, § 1064(c)(3) (codified at 47 U.S.C. § 923(c)(3)(B)).

[21] *See* OBRA-93, § 6001(a) (47 U.S.C. § 923(a)-(b)).

[22] *Id.*

[23] *Id.* (47 U.S.C. § 925(b)).

[24] *See Spectrum Reallocation Final Report*, Response to Title VI – Omnibus Budget Reconciliation Act of 1993, NTIA Special Publication 95-32, National Telecommunications and Information Administration, Department of Commerce, (rel. Feb. 1995) (*First Spectrum Reallocation Report*).

[25] *See* OBRA-93 at § 6002(a) (47 U.S.C. § 309(j)).

9. In BBA-97, the Congress directed the Secretary of Commerce to identify an additional 20 megahertz of spectrum below 3 GHz for transfer from Federal Government to non-Federal Government use to be assigned in compliance with Section 309(j) of the Communications Act of 1934, as amended (Communications Act).[26] In compliance with the requirements of this Act, the Secretary of Commerce issued a report in February, 1998, which identified six frequency bands for reallocation, including the 216-220 MHz, 1432-1435 MHz, and 2385-2390 MHz bands.[27] BBA-97 also expanded the Commission's auction authority by amending Section 309(j) of the Communications Act to provide that all mutually exclusive applications for initial licenses or construction permits *shall* be auctioned, except for licensing for public safety radio services and certain other types of broadcast licenses not applicable here.[28] Finally, BBA-97 authorized Federal Government entities to accept cash or in-kind payment to compensate for the marginal relocation costs associated with vacating spectrum transferred from Federal Government to non-Federal Government use, establishing a relocation regime similar to the Commission's relocation policy for Emerging Technology Services, such as the Personal Communications Services (PCS).[29] We also note that NTIA's Report on Identification of Alternate Bands identifies portions of 1.4 GHz band and the 1670-1675 MHZ band as candidates for substitution under the Balanced Budget Act of 1997.[30]

10. NDAA-99 requires that "[a]ny person on whose behalf a Federal entity incurs costs... shall compensate the Federal entity in advance for such costs. Such compensation may take the form of a cash payment or in-kind compensation."[31] Both the Commission and NTIA have interpreted this language as making mandatory the previously voluntary Federal Government reimbursement for relocation authorized in BBA-97. NDAA-99 applies only to the bands transferred to non-Federal Government use under BBA-97, to the 1710-1755 MHz band, and to future actions where commercial users of spectrum are seeking relocation in spectrum or modification in existing spectrum of a Federal Government station, but not to the bands transferred to non-Federal Government use under OBRA-93.[32]

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[26] *See* BBA-97, § 3002(e) (47 U.S.C. § 923(b)(3)). *See also* 47 U.S.C. § 309(j).

[27] *See Spectrum Reallocation Report*, Response to Title III of the Balanced Budget Act of 1997, NTIA Special Publication 98-36, National Telecommunications and Information Administration, Department of Commerce, (rel. Feb. 1998) (*Second Spectrum Reallocation Report*). NTIA also identified the 139-140.5 MHz, 141.5-143 MHz, and 1385-1390 MHz bands. Congress, however, later withdrew these bands, due to continuing Government operational needs.

[28] *See* BBA-97 at § 3002(a) (47 U.S.C. § 309(j)(2)).

[29] *Id* at, § 3002(d) (47 U.S.C. § 923(g)). *See also,* Redevelopment of Spectrum to Encourage the Establishment of Services Using New and Innovative Technologies, ET Docket No. 92-9, *First Report and Order and Third Notice of Proposed Rule Making,* 7 FCC Rcd 6886 (1992); *Second Report and Order,* 8 FCC Rcd 6495 (1993); *Third Report and Order and Memorandum Opinion and Order*, 8 FCC Rcd 6589 (1993); *Memorandum Opinion and Order*, 9 FCC Rcd 1943 (1994); *Second Memorandum Opinion and Order*, 9 FCC Rcd 7797 (1994), *aff'd,* Association of Public Safety Communications Officials-International, Inc. v. FCC, 76 F.3d 395 (D.C. Cir. 1996). *See also* Amendment of the Commission's Rules to Establish New Personal Communications Services, GEN Docket No. 90-314, *Memorandum Opinion and Order*, 9 FCC Rcd 5947 (1994).

[30] See Identification of Alternate Bands In Response to Title III of the Balanced Budget Act of 1997, NTIA Special Publication 98-39 (Nov. 1998).

[31] *See* NDAA at § 1064(c)(3).

[32] NDAA-99 provides that the mandatory reimbursement rules apply to the 1710-1755 MHz band, which was transferred to non-Government use under OBRA-93, but to no other bands transferred under OBRA-93.

Accordingly, the mandatory reimbursement rules apply to the 216-220 MHz, 1432-1435 MHz, and 2385-2390 MHz bands addressed in this proceeding.[33]

11. On November 22, 1999, the Commission released a *Spectrum Policy Statement*, which set forth guiding principles for reallocation of spectrum to encourage the development of telecommunications technology for the new millennium. In the *Spectrum Policy Statement*, the Commission provided a blueprint for the reallocation of approximately 200 megahertz of spectrum including the 27 megahertz addressed in this proceeding, and identified several spectrum management goals, including: (1) maximizing the value of the spectrum, both in terms of utility to the public and value at auction; (2) accommodating incumbent uses in the spectrum which provide valuable service to the public; and (3) fostering competition both within and between services, which will encourage the most economically and technically efficient use of the spectrum.[34]

12. In response to the statutes, spectrum reallocation reports, and *Spectrum Policy Statement*, we received five petitions for rule making, requesting allocation of one or more of the bands addressed in this proceeding. Regionet Wireless License, LLC (Regionet), requested that we reallocate the 218-219 MHz band to the Paging and Radiotelephone Service and pair the 218-219 MHz band with the 216-217 MHz band to allow two-way paging and response.[35] The Land Mobile Communications Council (LMCC) requested allocation of the 1390-1395 MHz, 1427-1435 MHz, and 1670-1675 MHz bands, among others, to the PLMRS for use by industrial and public safety licensees.[36] MicroTrax, Inc. (MicroTrax) requested an allocation of 5 megahertz from the 1390-1400 MHz, 1427-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, or 2385-2390 MHz bands for a new Personal Location and Monitoring Service (PLMS).[37] Itron, Inc. (Itron) requested an upgrade of the fixed and mobile secondary allocations (the use of which are limited to telemetry and telecommand applications) in the 1427-1432 MHz band to primary status, in order to enhance the status of utility telemetry.[38] Finally, three NVNG MSS licensees request that we allocate the 1390-1393 MHz and 1429-1432 MHz bands to Little LEOs.[39] These petitions along with the guidelines specified in the *Spectrum Policy Statement* formed the basis for the proposals made in the *Notice*.

13. In response to our *Notice*, we received 418 comments and 15 reply comments. A list of commenters is included as Appendix A.

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[33] *See* NTIA Notice of Proposed Rule Making for Frequency Band or Geographic Relocation of Federal Dependent-Systems, Docket No. 001206341-01, 66 Fed. Reg. 4771 (Jan. 18, 2001).

[34] *See Spectrum Policy Statement* at para. 21.

[35] *See* Regionet Petition for Rule Making, RM-9692 (filed Apr. 22, 1998).

[36] *See* LMCC Petition for Rule Making, RM-9267 (filed Jun. 10, 1999)

[37] *See* MicroTrax Petition for Rule Making, RM-9797 (filed Nov. 11, 1999)

[38] *See* Itron Petition for Rule Making, RM-9854 (filed Feb. 29, 2000).

[39] *See* Final Analysis Communications Services, Inc.; Leo One Worldwide, Inc.; Orbital Communications Corporation (collectively Little LEO licensees) Petition for Rule Making, PRM00IB (filed Aug. 16, 2000).

IV. DISCUSSION

A. Frequency Bands

1. 216-220 MHz Band

14. In ITU Region 2,[40] the 216-220 MHz band is allocated to the fixed and maritime mobile services on a co-primary basis and to the radiolocation service on a secondary basis.[41] Domestically, the 216-220 MHz band is allocated to the maritime mobile service on a primary basis for both Federal and non-Federal Government use. While there is no Federal Government use of this maritime mobile allocation, we have licensed the AMTS service in the 217-218 MHz (coast station transmit) and 219-220 MHz (ship station transmit) sub-bands for use along the coastlines and inland waterways of the United States, especially the Mississippi and Ohio Rivers and the Gulf of Mexico.[42] Federal Government use of the 216-220 MHz band includes the U.S. Navy's Space Surveillance (SPASUR) bi-static radar system in the 216.88-217.08 MHz sub-band.[43] The SPASUR system consists of high-powered radars at three transmit sites and six receive sites.[44] As a condition of the band's transfer, the SPASUR system will be protected indefinitely.

15. In addition, the 216-220 MHz band is allocated to the radiolocation service on a secondary basis for Federal Government use. The U.S. Coast Guard operates approximately 30 airsearch radars in the 216-225 MHz band, with the operating frequency at 220 MHz, in the Atlantic and Pacific Oceans.[45] The 216-220 MHz band is also allocated to the fixed, aeronautical mobile, and land mobile services on a secondary basis for Federal and non-Federal Government use, limited to telemetering and telecommand operations, such as gas pipeline data collection and remote monitoring of vehicle performance testing.[46] These secondary allocations are also used for wildlife and ocean buoy tracking, including airborne wildlife telemetry in the 216.0-216.1 MHz sub-band.[47]

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[40] The International Telecommunication Union (ITU) divides the world into three regions for the purposes of the International Table of Frequency Allocations, North and South America fall within Region 2. *See* 47 C.F.R. § 2.104(b).

[41] In Region 2, no new stations in the Radiolocation service may be authorized in the 216-225 MHz band. However, stations authorized prior to January 1, 1990 may continue to operate on a secondary basis. *See* 47 C.F.R. § 2.106, footnote S5.241.

[42] AMTS is an integrated and interconnected maritime communications system, which can provide radiotelephony, facsimile and teleprinter services. *See* 47 C.F.R. § 80.385.

[43] Footnote US229 states that "assignments to stations in the fixed and mobile services may be made on the condition that no harmful interference is caused to the Navy SPASUR system currently operating in the southern United States in the frequency band 216.88-217.08 MHz." *See* 47 C.F.R. § 2.106, footnote US229.

[44] *See* Appendix C, revised footnote US229, for coordinates of these sites. We observe that all of the SPASUR radars transmit on 216.98 MHz, with the Lake Kickapoo radar authorized an effective radiated power (ERP) of 766.8 kW and the Gila River and Jordan Lake radars authorized an ERP of 38.4 kW.

[45] We observe that this radiolocation mobile station assignment is authorized an ERP of 750 kW.

[46] *See* 47 C.F.R. § 2.106, footnote US274.

[47] *See* 47 C.F.R. § 2.106, footnote US210, and § 90.248.

16. Additionally, portions of the 216-220 MHz band are allocated to the following non-Federal Government services. The 216-217 MHz sub-band is available to the LPRS on a secondary basis and its permitted uses include auditory assistance devices, health care aids, law enforcement tracking systems, and point-to-point AMTS control stations.[48] The 218-219 MHz sub-band is allocated on a primary basis to the 218-219 MHz Service (formerly the Interactive Video and Data Services (IVDS)).[49] The 219-220 MHz sub-band is allocated to the amateur service on a secondary basis.[50]

17. In the *Notice*, we proposed to allocate the 216-220 MHz band to the fixed and mobile (except aeronautical mobile) services on a co-primary basis. Along with this general allocation, we proposed to require that any mobile service licensees that may be licensed in the band use the 216-218 MHz portion of the band for base station transmit and the 218-220 MHz portion of the band for mobile station transmit in order to minimize the potential of causing harmful interference to the reception of TV channel 13, which operates in the adjacent 210-216 MHz band. In addition, we asked for comment on whether we should elevate the status of telemetry or LPRS in this band to primary.[51] We expressed concern in the *Notice* about the continued viability of the incumbent, non-Federal Government services, particularly LPRS, in the 216-220 MHz band, which, while not authorized on a primary basis, serve important public needs.[52] Finally, we proposed to remove the wildlife and ocean tracking allocation from this band.[53]

18. In the *Notice*, we pointed out that NTIA recommended the transfer of the 216-220 MHz band from shared Government and non-Government use to mixed use[54] pursuant to BBA-97, and therefore licenses in the band must be awarded in accordance with Section 309(j) of the Communications Act in time for assignment of licenses by September 30, 2002.[55] The band will become available for non-Federal Government use in January 2002.[56] As we stated in the *Spectrum Policy Statement*, the

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[48] *See* 47 C.F.R. §§ 95.1009, 95.1011(c).

[49] The allocation is codified at 47 C.F.R. § 2.106, footnote US317. *See* Amendment of Parts 0, 1, 2 and 95 of the Commission's Rules to Provide Interactive Video and Data Services, GEN Docket No. 91-2, *Report and Order*, 7 FCC Rcd 1630 (1992). The redesignation of the service to the 218-219 MHz Service was intended to reflect the regulatory flexibility that the Commission afforded this band. The Commission stated that the IVDS service designation no longer reflected the breadth of evolving services in the band. *See* Amendment of Part 95 of the Commission's Rules to Provide Regulatory Flexibility in the 218-219 MHz Service, WT Docket No. 98-169, *Order, Memorandum Opinion and Order and Notice of Proposed Rulemaking*, 13 FCC Rcd 19064 (1998).

[50] *See* 47 C.F.R. § 2.106, footnote NG152. Use of this band by the amateur service is limited to stations participating, as forwarding stations, in fixed point-to-point digital message forwarding systems, including intercity packet backbone networks.

[51] *See Notice* at para. 16.

[52] *Id.* at para. 12.

[53] NTIA indicates that "...many of these wildlife telemetry functions can be satisfied in the bands between 32-42 MHz, the 40.60-40.70 MHz band or on the interstitial channels in the 162-174 MHz band..." *See Second Spectrum Reallocation Report* at § 3, p.3-17.

[54] *See First Spectrum Reallocation Report.*

[55] *See* BBA-97 at § 3002(e)(4)(B).

[56] *See Second Spectrum Reallocation Report* at 4-2.

216-220 MHz band is already used extensively for non-Federal Government services, which will limit the opportunities for new licensing in the band.[57] Any new service allocated on a primary basis in this spectrum will be required to protect existing primary licensees, including AMTS licensees and licensees in the 218-219 MHz Service. In addition, any new operations in the 216-220 MHz band are likely to be constrained by the need to protect TV channel 13, which occupies the adjacent 210-216 MHz band. This protection was one of the factors we considered in previously limiting use of the 216-217 MHz band to low power applications, such as LPRS and telemetry on a secondary basis.

19. We received a variety of comments regarding use of the 216-220 MHz band. Upon consideration of the comments received and as discussed below, we are adopting our proposal to allocate the 216-220 MHz band to the fixed and mobile (except aeronautical mobile) services on a co-primary basis. In addition, we are adopting rules to upgrade the status of the LPRS from secondary to primary on 216-217 MHz band. In making this allocation, we are retaining the secondary amateur service allocation at 219-220 MHz, the wildlife and ocean tracking allocation, as well as the secondary Government allocation. The rules adopted herein will continue to require licensees in this band to protect the Navy's SPASUR system.

20. As an initial matter, we observe that maintaining the secondary allocation in the 216-220 MHz band for wildlife and ocean tracking and for Government operations is a departure from our proposal.[58] However, we believe it is in the public interest to provide for the continuation of these services in this band. As described above, these services support scientific research as well as monitoring of critical infrastructure.[59] In making this decision it is important to note that the majority of these operations tend to be in rural and unpopulated areas, far from where most licensees operate. Because it is unlikely for these existing secondary services to operate in proximity to new services, this action will allow the continuation of important operations with no impact on the ability of new licensees to use this band.

21. With respect to the 217-220 MHz band, we observe that the allocation changes we are adopting herein will not provide any significant change to current use of the spectrum. We are eliminating the Federal Government's unused primary maritime mobile allocation and are proceeding with the service plans currently underway. The 217-218 MHz and 219-220 MHz segments are currently used by AMTS stations and the Commission has proposed rules to assign the remaining AMTS licenses by competitive bidding.[60] The 218-219 MHz band is currently allocated to the 218-219 MHz Service, formerly known as IVDS.[61] The Commission established that service in 1992, and by 1995 had issued

[57] *See Spectrum Policy Statement* at para. 27

[58] We note that no comments were received regarding the removal of the wildlife and ocean tracking allocation.

[59] *See* para. 15, *supra.*

[60] While these stations were originally intended to provide communications services for vessels along the Mississippi and Ohio rivers, the Commission adopted flexible spectrum policies for this band in 1997 which allow AMTS stations to also serve vehicles on land. *See* Amendment of the Commission's Rules Concerning Maritime Communications, PR Docket No. 92-257, *Second Report and Order and Second Further Notice of Proposed Rule Making*, 12 FCC Rcd 16949 (1997) and *Fourth Report and Order and Third Notice of Proposed Rule Making*, FCC 00-370, 15 FCC Rcd 22585 (2000).

[61] The original service envisioned for IVDS – interactive television applications – proved to be commercially unsuccessful, and licensees found that they were hampered by service rules narrowly tailored to such a service. Through a series of actions, the Commission waived or suspended certain buildout, auction payment, and technical rules. In 1999, the Commission substantially revised the service rules in order to allow licensees the flexibility to (continued....)

612 licenses in 306 Metropolitan Statistical Areas (MSAs).[62] We plan to award licenses for the remaining service areas in the 218-219 MHz Service in an upcoming auction.

22. With regard to the 216-217 MHz band, the LPRS auditory assistance and law enforcement applications are currently operating without encumbrance from a primary service due to technical limitations from adjacent band restrictions. The LPRS is ideally suited for this band given the technical limitations and propagation characteristics of the spectrum. Because LPRS devices operate with low power, they are susceptible to harmful interference from high-powered systems and thus not able to share well with many types of radios.[63] If forced to relocate, it is highly unlikely that these consumer devices could be cost effectively retuned and instead would have to be replaced. Because the LPRS is licensed by rule, all spectrum in the 216-217 MHz band is shared among all users.[64] Thus, it is not possible to have mutually exclusive applications under the current service rules.[65]

23. We note that the elevation of the LPRS to primary status is overwhelmingly supported by the comments.[66] Since its inception, this service has proved to be invaluable by allowing persons with hearing disabilities to attend and participate in mainstream activities at schools, theaters, places of worship, and sporting events. Phonic Ear states the properties of this band "... have resulted in new products that are cosmetically superior and more acceptable to the hard-of-hearing community, especially young people, than earlier generation products."[67] Further, the Hearing Industries Association (HIA)

(Continued from previous page)

provide a variety of fixed and mobile services in response to market demand. The Commission also extended the license term to ten years from license grant. The 1999 *Order* also established a restructuring plan for certain licensees who were participating in the Commission's installment payment program. Currently, those licensees who elected to reamortize their debt and resume their installment payments – as well as those who have paid in full or who obtained their licenses via lottery – may offer service under the revised 218-219 MHz Service rules. *See* Amendment Of Part 95 Of The Commission's Rules To Provide Regulatory Flexibility In The 218-219 MHz Service, WT Docket No. 98-169, *Report and Order and Memorandum Opinion and Order*, 15 FCC Rcd 1497 (2000)

[62] Eighteen licenses were issued by random selection (lottery) in 1993. In 1994, the Commission awarded the remaining licenses by auction. These licenses were issued in 1995. A 1997 auction was planned for Rural Service Area markets, but this auction was later postponed on January 29, 1997, in order to give the Commission an opportunity to consider a petition for rulemaking and numerous informal requests of potential bidders and license holders seeking to obtain additional flexibility for the service. *See* Amendment of Part 95 of the Commission's Rules to Provide Regulatory Flexibility in the 218-219 MHz Service, *Report and Order and Memorandum Opinion and Order*, WT Docket No. 98-169, RM-8951, 15 FCC Rcd 1497, 1501-02 ¶¶ 7-8 (1999) (*218-219 MHz Order*).

[63] LPRS may transmit voice, data, or tracking signals as authorizing under Part 95 of the Commissions rules. Two-way voice communications are prohibited. The maximum allowable ERP for a station in the LPRS is 100 mw and the maximum channel bandwidth is 25 kHz. AMTS stations must employ directional antennas.

[64] Licensed by rule means that all authorized users can access the entire available spectrum band without individual station licenses. *See* 47 U.S.C. § 307(e). Thus, no individual location records are maintained and no mutual exclusivity exists.

[65] Under the provisions of Section 309(j), only mutually exclusive applications are eligible to be granted through competitive bidding.

[66] Over 400 comments and letters were received by the Commission urging protection of the LPRS. *See, e.g.*, American Society for Deaf Children Comments and Hearing Industries Association Comments.

[67] *See* Phonic Ear Comments at 2.

cites a survey showing that approximately one million hearing-impaired persons currently use auditory assistance devices.[68] This number is expected to grow as the American population continues to age. Self Help for Hard of Hearing People (SHHH) refers to projections showing that by 2030 over 21 million Americans over the age 65 will have some hearing loss.[69] In addition, we note that the LPRS may also be used for health care related communications for the ill. Clearly, the public interest is served by protecting these devices so that persons with disabilities or suffering illness can continue to participate and contribute to all aspects of our society.

24. Providing a primary allocation for the LPRS in the 216-217 MHz band is also consistent with statutory requirements for providing access to facilities and services by persons with disabilities. Most notably, the Americans with Disabilities Act (ADA) requires businesses to make their public facilities and services accessible to persons with disabilities.[70] In fact, many businesses, such as theaters, stadiums, and other public gathering places, have complied with the ADA by installing auditory assistance devices in their facilities.[71] In addition, many states have used assistive listening devices to comply with the Individuals with Disabilities Education Act, which requires that State Government agencies provide children with disabilities with a free and appropriate public education.[72] Further, the Technology-Related Assistance for Individuals with Disabilities Act Amendments of 1994 promote the development and use of affordable telecommunications devices by persons with disabilities in places such as educational settings, public gathering places, and health care facilities.[73] In this connection, we note that many of the comments we received were from parents of children with hearing disabilities extolling the virtues of assistive listening devices. Most of these comments related instances of children showing marked improvements in school after a hearing disability was diagnosed and the child and classroom teacher began using an assistive listening device.[74]

25. LPRS is also used extensively by law enforcement agencies for law enforcement tracking systems (LETS).[75] These systems, which operate on two channels in the 216-217 MHz band, protect high-risk businesses, such as banks and jewelers, by assisting in the recovery of stolen money and property.[76] Currently, such systems are used by local police departments and the Federal Bureau of Investigation in 135 cities in the United States and have been instrumental in reducing crime rates. Allowing this service to continue to operate and providing protection by raising its status to primary along with the other LPRS Services will ensure that the valuable services provided by these systems

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[68] *See* HIA Comments at n. 4.

[69] See SHHH Comments at 2.

[70] *See* Americans with Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 327 (1990).

[71] For example, in New York, Madison Square Garden and Carnegie Hall make assistive listening devices available to persons with hearing disabilities. *See* The League for the Hard of Hearing web page at http://www.lhh.org/abc/cultural/index.htm.

[72] *See* Pub. L. No. 102-119, 105 Stat. 587 (1991).

[73] *See* Pub. L. No. 103-218, 108 Stat. 50 (1994).

[74] *See, e.g.*, Janie Samuel Comments, June McBride Comments, and James C. Dillon Comments.

[75] *See* 47 C.F.R. § 95.1009(c).

[76] *See* Electronic Tracking Systems Comments at 3.

remain accessible to the public. Based on the above discussion, we are amending the Table of Frequency Allocations in Section 2.106 and the LPRS rules in Part 95 to provide LPRS stations with primary status. In doing so, we are not making any other amendments to the LPRS service rules already in place. LPRS stations must continue to operate within the parameters of the current rules and protect the reception of television channel 13 and the Navy's SPASUR system.

26. As a practical matter, we believe that it will likely be difficult for secondary telemetry licenses to coordinate with LPRS, which is licensed by rule, and authorized to operate ubiquitously without prior notice. LPRS operations are primarily in and near urban areas. We are sympathetic with the Hearing Industry Association comments that LPRS devices could be protected from interference by prohibiting non-LPRS operations in major cities.[77] While it would not be equitable to force incumbent operations to relocate, we believe that we should no longer accept new applications in order to protect LPRS devices. Accordingly, new assignments will no longer be permitted for Government and non-Government operations in the 216-217 MHz band after January 1, 2002.

27. As described above, we are proceeding with our current plans to license the remainder of the 217-220 MHz band by competitive bidding.[78] Thus, we affirm our tentative conclusion in the *Notice* tnat it would be inappropriate to allow new co-primary services in this band.[79] In doing so, we note that because this band is already licensed in many areas, the transfer of the Federal Government spectrum will not free up significant additional capacity. By this action, we are rejecting the requests of numerous parties to this proceeding that asked for various rule amendments to the 216-220 MHz band. We observe that many of the specific requests for this band can be accommodated under the fixed and mobile (except aeronautical mobile) allocations we are adopting and the rules currently in place in the 217-220 MHz portion of the band or other spectrum regulated by the Commission. We address each commenter's request below.

28. In 1998, Regionet submitted a Petition for Rule Making, proposing that the 216-217 MHz band be paired with the 218-219 MHz band for use as a response channel and a paging channel, respectively, for a two-way paging system.[80] In that Petition, Regionet argued that a substantial market exists for two-way paging and that an additional allocation will serve this demand.[81] While we do not dispute Regionet's position that a market may exist for two-way paging, we do not believe that an additional allocation is necessary for this purpose. First, if Regionet wishes to operate paging systems in the 216-220 MHz band, it may do so under the flexible use policies of the 218-219 MHz Service spectrum. Second, we point out that Auction #40, Lower and Upper Paging Bands, will be held

[77] See Hearing Industry Association comments filed March 8, 2001 at 10.

[78] *See, e.g.*, Amendment Of Part 95 Of The Commission's Rules To Provide Regulatory Flexibility In The 218-219 MHz Service, WT Docket No. 98-169, *Report and Order and Memorandum Opinion and Order*, 15 FCC Rcd 1497 (2000) and Amendment Of The Commission's Rules Concerning Maritime Communications, WT Docket No. 92-257, *Fourth Report and Order and Third Further Notice of Proposed Rule Making*, 15 FCC Rcd 22585 (2000).

[79] *See Notice* at para. 15.

[80] *See* Regionet Petition for Rule Making, RM-9692 (filed Apr. 22, 1998). In a two-way paging system, the subscriber unit contains a low-power transmitter capable of allowing the user to send a response from a standard menu of data messages.

[81] *Id.* at 3-4.

beginning on October 30, 2001.[82] This auction will include 3,150 152-159 MHz band and 4,550 454-460 MHz band licenses suitable for two-way paging. Thus, we conclude, that ample spectrum and opportunity currently exists for Regionet and other entities that may be interested in providing two-way Paging Service to the public.

29. In its comments, Mobex Communications, Inc. (Mobex), an operator of AMTS stations, asks that we expand the spectrum available for AMTS stations to the entire 216-220 MHz band.[83] Mobex argues that the current rules in Section 80.385(a)(2) state the Commission's intention to revisit its decision that suspended the availability of the 216-217 MHz and 218-219 MHz bands from AMTS.[84] Mobex further states that the additional two megahertz is necessary in order to attract capital and manufacturers to the band.[85] Under its plan, Mobex would combine this additional spectrum with the two megahertz allocated to AMTS, which will be available in the upcoming AMTS auction. Mobex fails to demonstrate that the two megahertz they currently have access to is nearing capacity. Thus, we believe that allocating additional spectrum for AMTS at this time is unwarranted. Further, the plan put forward by Mobex would prohibit new LPRS use of the 216-217 MHz band.[86] As demonstrated above, such an action would be contrary to the public interest, as it would disenfranchise large segments of the disabled community.

30. Several commenters request that we set aside spectrum in the 216-217 MHz band for real-time kinematic (RTK) global positioning system (GPS) use.[87] In addition APCO requests spectrum for such use anywhere within the 216-220 MHz band.[88] Both public safety and non-public safety entities currently conduct such operations[89] on a secondary non-interference basis in the 450-470 MHz band under Part 90 of the Commission's rules.[90] The parties seeking an allocation for RTK GPS use argue that

[82] This auction was originally scheduled to begin June 26, 2001, but was postponed due to the need to conduct additional testing of web-based software. *See* Auction Of Licenses For Lower And Upper Paging Bands Fostponed Until October 30, 2001, *Public Notice*, DA 01-1307 (rel. May 25, 2001). *See also,* Auction Of Licenses For The Lower And Upper Paging Bands Scheduled For June 26, 2001, *Public Notice*, DA 01-593 (rel. Mar. 7, 2001).

[83] *See* Mobex Comments at 4. As detailed above, AMTS currently uses the 217-218 MHz band for ship transmit paired with the 219-220 MHz band for shore transmit.

[84] *Id. See also* 47 C.F.R. § 80.385(a)(2).

[85] *Id.* at 5.

[86] *Id.* at 7.

[87] *See, e.g.*, Trimble Comments, Pacific Crest Comments, and APCO Comments. RTK GPS is a surveying technique in which measurements are taken at a fixed reference point and then transmitted over a data link to a GPS station that uses those measurements along with its own measurements to compute its position. This technique is also known as differential GPS. Using RTK GPS equipment, position accuracy of one to two centimeters can be achieved. *See* Trimble Comments at 2-3.

[88] *See* APCO Comments at 2.

[89] Examples of public safety operations include data collection to assess damage after a natural disaster, development for routing systems for vehicles, and precise mapping of hazardous waste sites. Non-public safety uses include guidance and control of construction equipment and the positioning of mining equipment. *See* Trimble Comments at 3-4.

[90] *See* 47 C.F.R. § 90.261. Fixed operation may only be conducted on a secondary basis to land mobile operations.

because such use is increasing and because operations under Part 90 are secondary, it is increasingly difficult to find suitable spectrum on which to operate.[91] They further argue that because Part 90 segregates public safety users and non-public safety users into distinct frequency pools, *i.e.*, Public Safety and Industrial/Business,[92] neither type of user can take advantage of systems operated by the other.[93] In its comments, Trimble asks that RTK GPS be provided 300 kilohertz of spectrum and that RTK GPS users be allowed to transmit using power levels equivalent to that of Part 90 licensees operating in the 150-174 MHz band.[94] It contends that operating in the 216-217 MHz band would not harm LPRS users because RTK GPS employs carrier sense multiple access (CSMA)[95] techniques to avoid transmitting on an occupied channel.[96]

31. We are mindful of the difficulties that RTK GPS operators have had in using Part 90 frequencies. However, we do not believe that it would be appropriate to allow RTK GPS operations in the 216-217 MHz band. First, because such operations are data intensive and tend to operate at all hours, we believe that notwithstanding the use of CSMA, such operations would preclude the use of co-channel LPRS equipment in the same area. Additionally, because RTK GPS stations operating under the power levels requested by Trimble could communicate with stations up to 40 kilometers (25 miles) away or further, we do not believe that they could sense the low power (100 milliwatt) transmissions of LPRS stations. Thus, the effectiveness of using CSMA would be negated. Further, such power levels could interfere with the reception of TV channel 13 service on the lower end of the band and with AMTS Service on the upper end. In denying the request to provide spectrum in the 216-220 MHz band for RTK GPS, we point out that entities that wish to operate such systems can do so under the flexible service rules for AMTS and the 218-219 MHz Service, albeit at power levels below those requested. In addition, public safety entities could use some of their spectrum in the 700 MHz band for this use or entities (either users or manufacturers) could obtain spectrum from a band manager for such uses.[97]

32. The Amateur Radio Relay League (ARRL) requests that we expand the current secondary Amateur Service allocation at 219-220 MHz to include the entire 216-220 MHz band.[98] ARRL submits that currently amateurs must coordinate their operations in the 219-220 MHz band with nearby AMTS stations before operating.[99] Because it is necessary to protect these critical operations,

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[91] *See* Trimble Comments at 5.

[92] *See* 47 C.F.R. §§ 90.20 and 90.35.

[93] *See* Trimble Comments at 5 and APCO Comments at 3. In general, public safety users may only transmit on frequencies designated for the Public Safety Pool and all other users may only transmit on frequencies designated for the Industrial/Business Pool.

[94] *See* Trimble Comments at 7-8. Under the rules for Part 90, licensees in the 150-174 MHz band may operate with as much as 500 watts ERP. *See* 47 C.F.R. § 90.205(d).

[95] CSMA is a network control scheme in which a node verifies the absence of other traffic before transmitting.

[96] *See* Trimble Comments at 6.

[97] Another possibility for spectrum for RTK GPS operations is the 1390-1392 MHz band, which is being made available for fixed, mobile (except aeronautical mobile), and MSS (uplink) use under this Report and Order and Memorandum Opinion and Order. *See* para. 50, *infra*.

[98] *See* ARRL Comments at 7.

[99] *See* 47 C.F.R. §§ 80.385(a)(3) and 97.303(e).

ARRL concedes that amateurs have only been able to make limited use of this band. Notwithstanding ARRL's statements that the amateur service should remain secondary under any expansion of the 216-220 MHz band to which amateurs have access, we do not believe such expansion would be appropriate. As noted above, we have adopted a geographic area licensing scheme in the 217-220 MHz band segments, which should result in increased and more efficient use of these bands. Any increase in use of this spectrum by the Amateur Service within a licensee's service area could be detrimental to successful operations by the geographic area licensee. Additionally, because the existing complex coordination rules would have to be applied to the entire band, and such rules have foreclosed much use of the 219-220 MHz band by amateurs, we do not foresee much, if any, use of an expanded band by the amateur service. We also note, that amateur service licensees can operate message forwarding systems similar to those allowed in the 219-220 MHz band in any band in which they have privileges.[100] Accordingly, we are denying ARRL's request to extend the amateur service use of the band to the entire 216-220 MHz band. We will continue to make the 219-220 MHz band available to amateurs on a secondary basis. If amateur use of this band significantly increases in the future, we may revisit and reevaluate this decision.

33. Manufacturers and users of 216-220 MHz band telemetry equipment request that we elevate their operations from secondary to primary status.[101] They state that such action is needed to ensure that these operations continue to be viable for the transmission of "accurate, uncontaminated data."[102] Although we agree with commenters that telemetry operations play an important role in scientific research and testing, we are not inclined to afford primary status to such operations in this band. We continue to believe that secondary status is adequate. We have no indication that their existing secondary status has substantially constrained or impeded operations in this band. We note that many of these types of telemetry operations are temporary in nature and occur in areas with low population densities.[103] If primary status is necessary, operators can obtain primary status, under the fixed and mobile (except aeronautical mobile) allocations we adopt herein, either by acquiring a license at the auction for the 217-218 Service or AMTS, or by negotiating with a licensee in the desired area.

34. With respect to the 216-217 MHz band, we note that the Commission asked for comment in WT Docket No. 97-153 on the need to protect LPRS operations from telemetry operations in that band.[104] Based on the action taken here to elevate the LPRS allocation in the band to primary, no additional action is necessary to protect that service. Because LPRS is primary and telemetry remains secondary, telemetry operators must not cause interference to LPRS and telemetry is not entitled to any protection from LPRS.[105] This regulatory structure should not be problematic for many of the telemetry systems in this band because, as stated above, many of these operations take place in rural areas, while the majority of LPRS operations occur in populated areas.

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[100] *See* 47 C.F.R. § 97.219.

[101] *See, e.g.*, Farifield Industries Comments at 12 and United Telecom Council and American Public Power Association Joint Comments at 8.

[102] *See* Fairfield Industries Comments at 3.

[103] For example, telemetry equipment is often used to acquire and transmit seismic data from lakes, swaps, deserts, and inaccessible terrain.

[104] *See Part 90 Notice.*

[105] *See* 47 CFR § 2.104 (d).

35. Warren Havens requests that we create an Advanced Technologies 220 MHz Service encompassing the bands between 216-225 MHz[106] and Securicor asks that we allocate the 216-220 MHz band so that it is aligned with the 220-222 MHz band.[107] We note that, except for the portion of these requests that encompasses the 216-217 MHz band, these requests are beyond the scope of this Report and Order and will be addressed in the Companion Service Rule Notice. With respect to the 216-217 MHz band, we decline to make changes as requested by Warren Havens and Securicor for the reasons indicated above.[108]

2. The 1.4 GHz Bands

36. The 1.4 GHz spectrum encompasses 13 megahertz of spectrum in four segments at 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, and 1432-1435 MHz. In the *Notice*, we did not make specific allocation proposals for these bands, but instead presented several options for consideration.

a. Frequency Bands

37. 1390-1395 MHz Band: The 1390-1395 MHz band is allocated internationally in ITU Region 2 on a primary basis to the radiolocation service,[109] and on a secondary basis to the space research[110] (passive) and Earth exploration-satellite[111] (passive) services.[112] Domestically, the 1390-1395 MHz band is a Federal Government exclusive band that is allocated to the radiolocation service on a primary basis and to the fixed and mobile services on a secondary basis.[113] Federal agencies use this band for long-range air defense radars, military test range telemetry links, tactical radio relays, and radio astronomy.[114] In designating this band for transfer to non-Federal Government use, NTIA noted that high powered Federal Aviation Administration (FAA) and Department of Defense (DoD) radars would continue to operate in the lower adjacent band which could affect the performance of non-Federal Government receivers in the 1390-1395 MHz band.[115] In addition, NTIA stated that radio astronomy operations would continue within this band.[116] Footnote US311 to the Table of Frequency allocations

[106] *See* Warren Havens Comments.

[107] *See* Securicor Comments.

[108] *See* paras. 23-25, *supra*.

[109] *See* 47 C.F.R. § 2.106

[110] The space research service is a radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. *See* 47 C.F.R. § 2.1.

[111] The Earth exploration-satellite service is a radiocommunication service between earth stations and one or more space stations in which information relating to the characteristics of the Earth and its natural phenomena are obtained by active or passive sensors on Earth satellites.

[112] *See* 47 C.F.R. § 2.106 at footnote S5.339.

[113] *See* 47 C.F.R. § 2.106.

[114] *See First Reallocation Report* at Section 5.

[115] *Id.*

[116] *Id.*

requires that every practicable effort be made to avoid the assignment of frequencies in the band in the geographic areas where radio astronomy is conducted. As a condition of the reallocation, NTIA states that airborne and satellite downlink operations need to be prohibited to avoid interference to radio astronomy.[117] NTIA also stated that 17 military radar sites in the band will require protection until the year 2009. These protection areas, circles with radii of 80 kilometers, are scattered around the continental United States and Alaska, and range from sparsely populated desert areas to major metropolitan areas such as the Washington, D.C.-Baltimore, MD area.[118] Finally, we note that the 1390-1395 MHz band was transferred pursuant to OBRA-93 and is not subject to mandatory reimbursement of Federal Government incumbent relocation expenses.

38. 1427-1429 MHz Band: The 1427-1429 MHz band is allocated to the fixed, mobile (except aeronautical mobile), and space operation (Earth-to-space) services on a co-primary basis throughout the world.[119] Also, in some countries this band is used to search for intentional emissions of extraterrestrial origin.[120] Domestically, the 1427-1429 MHz band is allocated on a co-primary basis to Federal Government fixed and mobile (except aeronautical mobile) services and to the Federal and non-Federal Government space operation service.[121] The 1427-1429 MHz band is also allocated on a secondary basis to non-Federal Government fixed and mobile services, limited to telemetering and telecommand applications.[122] The Federal Government uses this band for military tactical radio relay communications and military test range aeronautical telemetry and telecommand.[123] NTIA stated that airborne operations or space-to-Earth communications should be avoided in this band to protect sensitive radio astronomy observations in the adjacent 1400-1427 MHz band.[124] In addition, NTIA stated that military airborne operations at 14 sites will require protection until the year 2004.[125] These sites, which must be protected within circles with radii ranging from 70-160 kilometers, are scattered around the continental United States and Alaska, and range from sparsely populated desert areas to major metropolitan areas such as the Washington, D.C.-Baltimore, MD area. The non-Federal Government use of this spectrum is for telemetry.[126] This band was transferred pursuant to OBRA-93 and is not subject to mandatory reimbursement of Federal Government incumbent relocation expenses.

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[117] *Id* at 5-3 ("reallocating this band for exclusive non-Federal use would require that... airborne and space-to-Earth transmissions be prohibited to protect radio astronomy").

[118] *Id.* at 4-2 through 4-4 and Table 4-2.

[119] The space operation service is a radiocommunication service concerned with the operation of spacecraft. In particular, space tracking, space telemetry, and space telecommand. *See* 47.C.F.R. § 2.1.

[120] *See* 47 C.F.R. § 2.106, footnote S5.341.

[121] We note that the space operation service allocation in this band is currently unused because of the need to protect passive Earth exploration-satellite operations in the lower adjacent 1400-1427 MHz band (according to NTIA staff).

[122] *See* 47 C.F.R. § 2.106.

[123] *See First Spectrum Reallocation Report* at Section 5.

[124] *Id.*

[125] *See First Spectrum Reallocation Report* at 4-6 and Table 4-2.

[126] *See* 47 C.F.R. § 90.259. We note that the majority of telemetry use in this band is by utility companies.

39. 1429-1432 MHz Band: In ITU Region 2, the 1429-1432 MHz band is allocated to the fixed and mobile services on a co-primary basis. Also, in some countries this band is used to search for intentional emissions of extraterrestrial origin.[127] Domestically, the 1429-1432 MHz band is allocated to the Federal and non-Federal Government land mobile service on a primary basis for WMTS[128] use. The 1429-1432 MHz band is allocated to the fixed and land mobile services on a secondary basis for non-Federal Government use, limited to telemetering and telecommand applications.[129] Federal Government uses of this band are identical to those described above for the 1427-1429 MHz band. Thus, operations in this band must also protect military airborne operations at the same 14 sites as for the 1427-1429 MHz band. This band was transferred pursuant to OBRA-93 and is not subject to mandatory reimbursement of Federal Government incumbent relocation expenses.

40. 1432-1435 MHz Band: In ITU Region 2, the 1432-1435 MHz band is allocated to the fixed and mobile services on a co-primary basis. Also, in some countries this band is used to search for intentional emissions of extraterrestrial origin.[130] Domestically, the 1432-1435 MHz band is allocated to the fixed and mobile services on a primary basis for Federal Government use. The 1432-1435 MHz band is allocated to the fixed and land mobile services on a secondary basis for non-Federal Government use, limited to telemetering and telecommand applications.[131] This band is also used for the passive search for signals of extraterrestrial origin.[132] This band is used by the military for tactical radio relay communications, military test range aeronautical telemetry and telecommand, and various types of guided weapon systems.[133] NTIA stated that military airborne operations and their associated airspace will need to be protected at 23 sites indefinitely. These protection areas, circles with radii ranging from 3 kilometers to 160 kilometers, are scattered around the continental United States and Alaska, and range from sparsely populated desert areas to major metropolitan areas such as the Washington, D.C.-Baltimore, MD area.[134] This band was transferred to non-Federal Government use pursuant to BBA-97, and therefore licenses must be assigned in accordance with Section 309(j) of the Communications Act. In addition, new licensees must compensate Federal Government entities in advance for marginal costs incurred in relocating their facilities from the band.[135]

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[127] *See* 47 C.F.R. § 2.106, footnote S5.341.

[128] *See* note 10, *supra* for a description of the WMTS.

[129] *See* 47 C.F.R. § 2.106. *See also*, 47 C.F.R. § 2.106, footnote US350.

[130] *See* 47 C.F.R. § 2.106, footnote S5.341.

[131] *See* 47 C.F.R. § 2.106.

[132] *Id.*, footnote S5.341.

[133] *See Second Spectrum Reallocation Report* at 4-3.

[134] *See First Spectrum Reallocation Report* at 4-3 and Table 3-4.

[135] *See Second Spectrum Reallocation Report* at 4-1.

b. Band Plan

41. The band plan options that we proposed in the *Notice* are summarized in Table 1, below.[136]

Table 1: Summary of 1.4 GHz Band Plan Options

Band	1390-1392 MHz	1392-1395 MHz	1427-1429 MHz	1429-1432 MHz	1432-1435 MHz Assign Pursuant to 309(j) Subject to NDAA-99
Current Allocations	Federal Government: RADIOLOCATION Fixed Mobile		Federal Government: SPACE OPERATION (uplink) FIXED MOBILE (except aeronautical Mobile)	Federal Government: LAND MOBILE (WMTS)	Federal Government: FIXED MOBILE
			non-Federal Gov't: SPACE OPERATION (uplink) Fixed (telemetry) Land mobile (telemetry & Telecommand)	non-Federal Gov't: LAND MOBILE (WMTS) Fixed (non-med. telemetry) Land mobile (non-medical telemetry & telecommand)	non-Federal Gov't: Fixed (telemetry) Land mobile (telemetry & telecommand)
Option 1	FIXED & MOBILE (except aeronautical mobile) for PMRS use and pair with 1427-1429 MHz (site license)	FIXED & MOBILE (except aeronautical mobile) for PMRS use and pair with 1432-1435 MHz (band manager)	FIXED & MOBILE for PMRS use and pair with 1390-1392 MHz (site license)	Upgrade non-medical telemetry to co-primary status with WMTS	FIXED & MOBILE for PMRS use and pair with 1392-1395 MHz (band manager)
Option 2	FIXED & MOBILE (except aeronautical mobile) for unpaired operations		Upgrade telemetry to primary status		
Option 3	Allocate to FIXED & MOBILE (except aeronautical mobile) for PMRS use and to MSS (feeder uplinks) on a co-primary basis		1427-1430 MHz: Shift WMTS down in frequency and upgrade non-medical telemetry to primary status so that both medical and non-telemetry telemetry operates on a co-primary basis in this band	Allocate 1430-1432 MHz to FIXED & MOBILE for PMRS use and to MSS (feeder downlinks) on a co-primary basis	

42. We received a wide range of comments based on the options presented. In general, land mobile interests, such as LMCC, support Option 1,[137] utility companies support Option 2,[138] and satellite interests support Option 3.[139] Many commenters offered suggestions for modifications to the options presented.

[136] In Table 1 of the *Notice*, we observe that MS, which is the abbreviation for the mobile service, was inadvertently used for the 1390-1395 MHz band, whereas in the proposed rules, mobile (except aeronautical mobile) is shown. *See Notice*, Appendix A. In this Report and Order, we allocate on a primary basis the 1390-1395 MHz and the 1432-1435 MHz bands to the mobile (except aeronautical mobile) service and the 1427-1429 MHz band to the land mobile service. We maintain the primary land mobile allocation in the 1429-1432 MHz band. *See* para. 48, Table 2.

[137] *See, e.g.*, LMCC Comments.

[138] *See, e.g.*, Bay State Gas Company Comments and Keyspan Energy Delivery Comments.

[139] *See, e.g.*, Satellite Industry Association (SIA) Comments.

43. LMCC, in its comments, asks that we adopt Option 1, which would establish a Land Mobile Communications Service (LMCS), in accordance with the plan to establish a new 10 MHz LMCS as described in the *Spectrum Policy Statement*.[140] LMCC has submitted two Petitions for Rule Making seeking additional spectrum for private land mobile radio (PLMR) entities, claiming that additional allocations would relieve congestion in existing PLMR bands and provide opportunities for spectrum efficient technologies.[141] LMCC notes that under Option 1, the 1392-1395 MHz and 1432-1435 MHz bands would be licensed to any interested party and urges that we instead assign licenses in this segment of the 1.4 GHz band to band managers. LMCC argues that band managers would help ensure that spectrum is used by PLMR users who generally do not have the resources to compete with Commercial Mobile Radio Service (CMRS) providers in an auction.[142] Finally, a number of commenters representing the private radio community support LMCC's position.[143]

44. The United Telecom Council and the American Public Power Association (UTC/APPA), in joint comments, support Option 2. They argue that this option would allow utilities to increase productivity and efficiency and to establish a direct link to customer premises utility meters.[144] Additionally, UTC/APPA claim that Option 2 would promote competition in a deregulated environment.[145] Bay State Gas recommends that the we adopt Option 2 because it would serve the public interest in providing a "home" for automatic meter reading and protect the substantial investment made in such equipment by utilities and other critical infrastructure companies.[146] These parties also assert that allocating the 1427-1432 MHz band for telemetry operations would harmonize spectrum use with Canada, thereby simplifying cross-border coordination and affording U.S. manufacturers and service providers a wider market opportunity.[147]

45. The American Hospital Association (AHA) and Itron ask that we adopt a modified version of option 2 that would allocate the entire 1427-1432 MHz band on a primary basis to the WMTS and to utility telemetry services.[148] To support its claims that utility telemetry is well suited to this band, Itron states that, for over seven years, this service has co-existed in this band with Federal Government

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[140] *See Spectrum Policy Statement* at para. 24.

[141] *See* LMCC, *Petition for Rule Making*, RM-9267 (filed Apr. 22, 1998) and LMCC, *Petition for Rule Making*, RM-9267 (filed Jun. 10, 1999)

[142] See LMCC Comments at 5-6.

[143] *See, e.g.*, Comments of Manufacturers Radio Frequency Advisory Committee, Comments of Automobile Club of Hartford, Inc., Comments of California State Automobile Association, and Comments of American Petroleum Institute.

[144] *See* UTC/APPA Joint Comments at 5. We note that UTC/APPA also provide comments in support of Option 1 stating that this option is the best method for obtaining additional spectrum that could serve a variety of critical communications needs. *See* UTC/APPA Joint Comments at 4.

[145] *Id.* at 6.

[146] *See* Bay State Gas Comments at 2.

[147] *Id.* at 4. *See also*, KeySpan Energy Delivery Corporation Comments and Hometown Connections International, LLC Comments.

[148] *See* AHA Comments at 2 and Itron Comments at 10.

users and the adjacent radio astronomy operations.[149] Also, Itron states that because utility telemetry operates at low power levels, it is well suited to share spectrum with WMTS systems.[150] AHA argues that WMTS and utility telemetry cannot co-exist in three megahertz of spectrum as Option 2 would provide[151] because WMTS needs at least 3 megahertz of spectrum in the 1427-1432 MHz band.[152] In concert with Itron, AHA points out that WMTS is not compatible with co-channel higher power utility telemetry, and only through the sharing arrangement that they have worked out can these uses be accommodated.[153] This sharing plan would essentially provide utility telemetry with use of the 1429.5-1432 MHz band and WMTS with use of the 1427-1429.5 MHz band, except that in certain areas where utility telemetry systems are already operating in the 1427-1429 MHz band, the spectrum would be divided up somewhat differently. Also, the AHA/Itron plan specifies power and field strength levels to control interference.[154] Both AHA and Itron subsequently filed additional information clarifying their original proposal to specifically state that WMTS and utility telemetry could not share spectrum on a co-primary basis in the same specific geographic location.[155]

46. Option 3, which would provide feeder link spectrum for Little LEOs (1390-1392 MHz for feeder uplinks and 1430-1432 MHz for feeder downlinks), was supported by satellite interests. The Satellite Industry Association (SIA) along with Final Analysis Communications Services, Inc. and Orbital Communications Corporation (Joint Satellite Commenters) state that this option is the only one that would ensure efficient use of the spectrum for all users, in that it would accommodate the WMTS, utility telemetry, and the LMCS.[156] The Joint Satellite Commenters state that they could accept a compromise allocation of four megahertz rather than the six megahertz they are seeking worldwide.[157] This spectrum, they claim, is needed to avoid decreasing service capacity by operating feeder links in the same spectrum used for service links. These commenters submit that they can protect radio astronomy operations in the adjacent band by using efficient modulation techniques.[158] Also, they indicate that international studies, which have shown that operations adjacent to radio astronomy are feasible, have assumed Little LEO feeder links operating in the 1429-1432 MHz band, not the 1430-1432 MHz band which provides an additional megahertz of separation.[159] The Joint Satellite Commenters also state that

[149] *See* Itron Comments at 7.

[150] *Id.* In the details of their sharing plan, Itron shows effective isotropic radiated power (EIRP) levels of 1 watt, 10 watts, and 100 watts depending on the spectrum and geographic area in which the system is deployed. *Id.* at Attachment, page 4.

[151] *See* AHA Comments at 9.

[152] *See* AHA *ex parte* Notice (filed Jun 12, 2001).

[153] *Id.* at 8.

[154] Details of the sharing plan can be found in AHA's Comments at 11-12 and Itron's Comments at the Attachment.

[155] See AHA *ex parte* Notice (filed August 29, 2001) and Itron *ex parte* Notice (filed September 6, 2001).

[156] *See* SIA Comments at 2-3 and Joint Satellite Commenters at 7.

[157] *Id.*

[158] *Id.* at 13.

[159] *Id.* The Joint Satellite Commenters cite studies submitted to the International Telecommunications Union – Radiocommunication Sector (ITU-R) Working Party 8D, which were approved and sent to ITU-R Study Groups 7 and 9. Also cited are studies conducted by ITU-R Working Parties 7C and 7D. *Id.* at 10-11.

they can share spectrum with PLMRS because they only need a small number of earth stations that will likely be located in remote areas away from the vast majority of land mobile operations and these stations will operate within very low power flux density (PFD) limits on the ground.[160] Finally, we have received two Petitions for Reconsideration from parties representing satellite industry interests of our allocation decision in ET Docket No. 99-255 to place the WMTS in the 1429-1432 MHz band. These petitions generally make the same arguments for reconsidering that decision and reallocating that spectrum for Little LEO feeder links as the Joint Satellite Commenters make in their comments.[161]

47. The Joint Satellite Commenters oppose options 1 and 2 because these options do not provide spectrum for Little LEO feeder links.[162] Land mobile interests oppose options 2 and 3. They claim that Option 2, by allocating the 1427-1432 MHz band for telemetry and WMTS, would leave the 1390-1392 MHz band unpaired with little usefulness.[163] In opposition to Option 3, LMCC states that it does not believe that sharing is possible between land mobile services and Little LEO feeder links.[164] Likewise, utility companies and the AHA assert that they cannot share the same spectrum with Little LEO feeder links.[165] As detailed above, the satellite interests dispute this claim.[166] The National Academy of Sciences through the National Research Council's Committee on Radio Frequencies (CORF) is also opposed to Option 3.[167] CORF states that it is premature to judge the outcome of the current ITU sharing studies which are looking at the feasibility of allowing Little LEO downlinks in the 1429-1432 MHz band.[168] In addition, CORF states that uplinks should be prohibited above 1392 MHz in

[160] *Id.* at 14-15.

[161] *See* Final Analysis Communications Services, Inc., Leo One Worldwide, Inc, and Orbital Communications Corporation Petition for Reconsideration (filed Aug. 16, 2000) and The Satellite Industry Association Petition for Reconsideration (filed Aug. 16, 2000).

[162] *See* Joint Satellite Commenters Reply Comments at 2.

[163] *See* LMCC Comments at 8.

[164] *Id.*

[165] *See* UTC/APPA Comments at 6 and AHA Comments at 10. *See also*, AHA *ex parte* Notice (filed Jun. 12, 2001). In that Notice, AHA asserts that they cannot share the same spectrum with Little LEOs, but is silent on whether they can share adjacent spectrum.

[166] *See* para. 46, *supra*.

[167] *See* CORF Comments. CORF represents the scientific users of the radio spectrum. Specifically their comments promote the interests of the Earth-Exploration Satellite Service (EESS) and the Radio Astronomy Service (RAS) which operate passive sensors on a primary basis in the 1400-1427 MHz band. *See* 47 C.F.R. § 2.106. CORF explains that this band must be protected due to the important spectral properties of this band. For example, over ninety percent of the atoms in the universe are hydrogen atoms. At their ground state, these atoms emit a rest frequency of 1420.406 MHz. However the expansion of the universe causes these atoms to move away from the earth. Scientists can measure the resulting doppler frequency shift and calculate the distance to the source. *See* CORF Comments at 4. Throughout their comments, CORF provides additional examples of the scientific uses of this band.

[168] *Id.* at 5-6.

order to protect passive sensor operations in the 1400-1427 MHz band, which use ultra-sensitive receivers and high-gain antennas.[169]

48. Upon consideration of the various options and the comments, we believe that it is possible to craft a spectrum allocation plan that satisfies the needs of each of the user groups interested in the 1.4 GHz spectrum. While our spectrum plan does not meet the full request of any one user, it does provide some spectrum for all parties in a way that we believe allows each party to mutually coexist and provide services with minimal potential for harmful interference. We also note that new licensees in these bands must protect incumbent Federal Government licensees as specified above.[170] The allocation plan being adopted for the 1.4 GHz spectrum is shown in the table below:

Table 2: 1.4 GHz Band Plan

1390-1392 MHz	1392-1395 MHz	1427-1429.5 MHz	1429.5-1432 MHz	1432-1435 MHz
MOBILE (except aeronautical mobile); unpaired operations FIXED NGSO MSS FEEDER UPLINKS (conditioned on international allocation)	MOBILE (except aeronautical mobile); paired with 1432-1435 MHz FIXED	LAND MOBILE (WMTS) Fixed & land mobile (non-medical telemetry)	FIXED & LAND MOBILE (telemetry) 1430-1432 MHz NGSO MSS FEEDER DOWNLINKS (conditioned on international allocation)	MOBILE (except aeronautical mobile); paired with 1392-1395 MHz FIXED

49. As shown in Table 2, we are providing six megahertz of spectrum for fixed and mobile (except aeronautical mobile) uses by pairing the 1392-1395 MHz band with the 1432-1435 MHz band. This spectrum pairing was consistent throughout each of our options and was not disputed by any party. As noted above, aeronautical mobile use will be prohibited in the 1392-1395 MHz band to protect radio astronomy operations in the 1390-1400 MHz band.[171] Thus, we will also prohibit aeronautical mobile use in the paired 1432-1435 MHz band. Further, Because the 1432-1435 MHz band was transferred to non-Federal Government use pursuant to BBA-97, licenses must be assigned in accordance with Section 309(j) of the Communications Act. In addition, new licensees must compensate Federal Government entities for marginal costs incurred in relocating their facilities from the band.[172] While the specific service and licensing rules for these bands will be the subject of the companion Service Rule Notice, we observe that this spectrum may be well suited for licensing to band managers. Band managers could make spectrum available to PLMRS entities that are experiencing congestion in other bands. We are limiting this allocation to land mobile use rather than a general mobile allocation to protect sensitive adjacent channel operations such as radio astronomy.

[169] *Id.* at 7.

[170] *See* paras. 37, 38, 39, and 40, *supra* for a description of protection that must be given to Government licensees in the 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, and 1432-1435 MHz bands, respectively.

[171] *See* footnote 117, *supra.*

[172] *See Second Spectrum Reallocation Report* at 4-1.

50. We are making an additional two megahertz of unpaired spectrum available for a flexible fixed, mobile (except aeronautical mobile), and MSS (uplink) allocation in the 1390-1392 MHz band. Because airborne operations would be incompatible with co-channel satellite uplinks and sensitive radio astronomy operations that occur in-band and in the adjacent bands, we are prohibiting aeronautical mobile use.

51. This allocation makes a total of eight megahertz of spectrum potentially available to the mobile (except aeronautical mobile) service. Although this is less than the ten megahertz LMCC sought in its petition for rule making and its comments, we believe that this provides sufficient spectrum to relieve much of the crowding in existing land mobile bands. Further, by making some unpaired spectrum available, we hope to encourage innovative technologies, such as time division duplex (TDD), to locate in this band. Also, this unpaired spectrum is well suited to services that traditionally operate one-way communications services, such as paging and telemetry systems.[173]

52. The flexible allocation in the 1390-1392 MHz band also allows this spectrum to be used for satellite feeder uplinks by Little LEOs. This allocation is consistent with the views expressed by (CORF) proposing to limit uplink transmissions to spectrum below 1392 MHz.[174] However, the allocation will be contingent on completion of ongoing studies and an international allocation for such feeder links through the international process.[175] To codify this allocation, we will add a new footnote, US368, to the Table of Frequency Allocations in Section 2.106 of the Commission's rules.

53. An issue of concern from the land mobile industry has been the ability of satellite systems to successfully share spectrum with land mobile stations. Because spectrum in the 1390-1392 MHz band would be used for feeder uplinks, we believe that such sharing can be accomplished while still minimizing the potential for harmful interference between satellite earth stations and land mobile stations. As pointed out by the Joint Satellite Commenters, licensees using this band for feeder uplinks only need a few earth stations that can be located in areas where land mobile use is least likely to occur. Thus, through geographic separation, land mobile and satellite earth stations will be able to co-exist in this band.[176] Satellite and land mobile licensees will have to coordinate their operations to ensure sufficient separation distance and/or shielding between stations.

54. In the remaining five megahertz (1427-1432 MHz), we are allocating the 1427-1429 MHz band to the land mobile service on primary basis and maintaining the current land mobile primary allocation in the 1429-1432 MHz band. Under this allocation, the 1427-1429.5 MHz segment will be limited to WMTS and the 1429.5-1432 MHz segment will be limited to telemetry. In addition, the 1429.5-1432 MHz segment is being allocated for fixed service on a co-primary basis also limited to telemetry operations. Further, we are conditionally permitting Little LEO feeder downlinks to share the 1430-1432 MHz band with telemetry on a co-primary basis. This allocation decision shifts WMTS down in frequency from its current allocation at 1429-1432 MHz and elevates telemetry

[173] We also note that entities may be able to use this spectrum for RTK GPS. *See* para. 30, *supra*.

[174] *See* CORF Comments at 7. In their comments, CORF argues that suitable limits for uplink power levels and out-of-band filtering requirements must be imposed. These issues will be explored in a separate service rule proceeding.

[175] *See* para. 55, *infra*.

[176] Such a finding is consistent with our treatment of sharing between new non-Government stations and Radio Astronomy receivers in the 1670-1675 MHz band. *See* para. 65, *infra*.

operations to primary status in the 1429.5-1432 MHz segment. Non-medical telemetry will continue to operate with secondary status in the 1427-1429.5 MHz segment. Finally, we are removing the space operation (Earth-to-space) allocation from the 1427-1429 MHz band, as that allocation is incompatible with the allocation decisions we make above. WMTS will continue to be licensed by rule in the modified allocation.[177] Under this licensing scheme, WMTS licensees share spectrum with each other and applications are not mutually exclusive. Thus assignments are not subject to competitive bidding pursuant to Section 309(j) of the Communications Act.[178]

55. Our allocation of the 1430-1432 MHz segment for Little LEO feeder downlinks, similar to the allocation for uplinks in the 1390-1392 MHz band, is contingent on completion of ongoing studies and adoption of an international allocation for this spectrum. All sharing studies must be completed and show that satellite downlink sharing is feasible with operations in the 1400-1427 MHz band before such an international allocation is adopted and our domestic allocation is finalized. We note that the sharing studies currently underway contemplate a satellite allocation in the 1429-1432 MHz band, but we have limited this allocation to the 1430-1432 MHz band which will provide an additional megahertz of guard band between the downlinks and the EESS and RAS Services. Once such an allocation is finalized, Little LEO operators may seek adoption of service rules, and issuance of necessary authorizations under Part 25 of our rules for feeder links subject to coordination with telemetry operations in the same spectrum.

56. We do not believe that the addition of Little LEO feeder downlinks in this band will preclude the use of the band by telemetry systems due to the low PFD levels of the satellite signals relative to the power levels of telemetry systems.[179] We are confident that such limits will not preclude satellite earth stations in this band. However, these earth stations may have to locate in rural areas and use large, high gain antennas to ensure reception of the satellite signals. Because we anticipate that telemetry operations will be concentrated largely in urban areas, sharing can be readily accomplished.

57. Our decision to shift the WMTS allocation down to 1427-1429.5 MHz is consistent with the position of AHA, which in a recent *ex parte* filing indicated that it needed at least 2.5 megahertz under a primary allocation in the 1.4 MHz spectrum, preferably at 1427-1429.5 MHz.[180] AHA indicates that at 1427-1429.5 MHz, WMTS would be adjacent to radio astronomy instead of potentially high powered land mobile operators and thus would not require a guard band making spectrum use more efficient. AHA also requests that adjacent band telemetry services operating in 1429.5-1432 MHz be limited to fixed utility telemetry operations in order to minimize the impact on WMTS operations. We note that there are currently telemetry operations that are not fixed or limited to utility telemetry, which would have to be relocated to implement AHA's request.[181] We did not seek comment on relocating incumbents in this band and such action would need to be addressed in the companion service rule proceeding. We do, however, note that medical telemetry system operators can also use the 608-614 MHz and 1395-1400 MHz bands to obtain additional capacity for their systems.

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[177] *See* 47 C.F.R. § 95.1101

[178] *See* 47 C.F.R. § 95.401 et seq.

[179] *See* note 150, *supra*, for information on utility telemetry power levels.

[180] *See* AHA *ex parte* filed August 29, 2001.

[181] Existing licensees and entities licensed prior to the adoption of final service rules in our companion service rule proceeding will retain secondary status under the terms of their current license for the 1427-1432 MHz band.

58. We are deferring consideration of the proposed AHA/Itron band swap. AHA and Itron's proposal contemplated carving out 7 geographic areas in the Medical Telemetry band for utility telemetry and then compensating Medical telemetry with corresponding spectrum in the telemetry band to our companion service rule proceeding. These 7 sites represent areas where Itron has built out existing facilities under the current secondary telemetry allocation. We believe that spectrum allocations in general should be kept as flexible as possible and that issues such as eligibility or unique requirements/restrictions should be addressed in service rules.

59. In making these allocation decisions in the 1.4 GHz spectrum, we deny the Petitions for Reconsideration filed by Little LEO entities in ET Docket No. 99-255. However, we note that substantively, this proceeding is providing a substantial portion of what the petitioners have indicated they needed to operate. The Petitions asked that we allocate the 1429-1432 MHz band for Little LEO feeder links and eliminate the WMTS allocation in this band. As described above, we believe that there is substantial public interest in maintaining an allocation for WMTS and are shifting the allocation to 1427-1429.5 MHz. We are elevating telemetry to primary in the 1429.5-1432 MHz portion of the band and believe that such systems can share this spectrum with Little LEO systems. Accordingly, we have provided a mechanism by which Little LEOs can obtain an allocation in the 1430-1432 MHz band. While the Petitions for Reconsideration seeking an exclusive allocation of three megahertz of spectrum at 1427-1432 MHz for Little LEOs are denied, we are providing 2 MHz of spectrum in the requested frequency range for Little LEOs conditioned on adoption of an international allocation for this spectrum.

60. We believe that the allocation plan for use of the 1.4 GHz spectrum set forth above provides a reasonable compromise solution that will best accommodate the needs of all parties interested in this band. Through careful planning and coordination, these parties will be able to share spectrum and satisfy their communications needs, while maximizing the efficient use of scare spectrum resources.

3. 1670-1675 MHz Band

61. In ITU Region 2, the 1670-1675 MHz band is allocated to the fixed, mobile, meteorological-satellite (space-to-Earth) (METSAT downlinks), and meteorological aids[182] services on a co-primary basis.[183] Also, in some countries this band is used to search for intentional emissions of extraterrestrial origin.[184] Domestically, the band is allocated on a primary basis to Federal and non-Federal Government meteorological aids service and for METSAT downlinks.[185] This band is also used to passively search for signals of extraterrestrial origin.[186] Because the lower adjacent band is used for radio astronomy, applicants for airborne or space station assignments are urged to take all practical steps to protect those operations.[187] Currently the band is also used for weather satellites and

[182] The meteorological aids service is a radiocommunication service used for meteorological, including hydrological, observations and exploration. *See* 47 C.F.R. § 2.1.

[183] The meteorological-satellite service is an Earth exploration-satellite service for meteorological purposes. *See* 47 C.F.R. § 2.1.

[184] *See* 47 C.F.R. § 2.106, footnote S5.341.

[185] *See* 47 C.F.R. § 2.106.

[186] *Id.* at footnote S5.341.

[187] *See* 47 C.F.R. § 2.160, footnote US211.

radiosondes.[188] The band contains downlinks for three earth stations that operate as part of the Geostationary Operational Environmental Satellite System (GOES) by the National Environmental Satellite, Data and Information Service (NESDIS). These satellites, which provide much of the satellite imagery used in newscasts, are controlled from earth stations at Wallop's Island, Virginia, Greenbelt, Maryland, and Fairbanks, Alaska. NTIA stated that the stations at Wallop's Island and Fairbanks will need protection indefinitely.[189] NTIA has since informed the Commission that protection of the site at Greenbelt is also required.[190] The 1670-1675 MHz band was transferred to non-Federal Government use pursuant to OBRA-93, and therefore new entrants in the band will not be required to reimburse Federal Government incumbents for relocation.

62. Several entities expressed interest in the 1670-1675 MHz band. AeroAstro would like to use the band for mobile terminals as part of a Satellite Enabled Notification System (SENS) it is developing.[191] SENS would enable users to transmit short data messages anywhere worldwide for receipt via the Internet. The system would consist of mobile ground terminals, small low-cost space stations, and fixed earth stations. MicroTrax requests that we establish a Personal Location and Monitoring Service (PLMS) in this band.[192] This system would enable the tracking of people and objects.[193] ArrayComm comments that it would like to implement its i-BURST technology in this band.[194] ArrayComm states that i-BURST would combine time division duplex (TDD) technology and smart antennas to deliver high-speed packet data at reasonable prices.[195]

63. In the *Notice*, we proposed to allocate the 1670-1675 MHz band to the fixed and mobile (except aeronautical mobile) services and to adopt rules that would make the band usable for a number of potential services.[196] We specifically noted that five megahertz of unpaired spectrum could be useful for service providers interested in deploying TDD equipment.[197]

64. We believe that a number of technologies, including the three described above, are well suited to this band. Therefore, in keeping with our policy of providing flexibility where possible and appropriate so that potential licensees can determine and offer the services that are valued most highly,

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[188] A radiosonde is an automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free balloon, kite, or parachute that transmits meteorological data. *See* 47 C.F.R. § 2.1.

[189] *See First Spectrum Reallocation Report* at Section 5.

[190] *See NTIA Letter*. Since enactment of OBRA-93 and the issuance of the *First Spectrum Reallocation Report*, Congress directed the National Oceanic and Atmospheric Administration (NOAA) to build a facility to back-up the station at Wallops Island in case that station lost service due to a hurricane or other disaster. NOAA selected the site at Greenbelt Maryland for this function.

[191] *See* AeroAstro Comments at 2.

[192] *See* MicroTrax Comments at 2.

[193] *Id.* at 4.

[194] *See* Arraycomm Comments at 3.

[195] *Id.* at i.

[196] *See Notice* at para. 42.

[197] *Id.* at para. 41.

we are adopting our proposal to provide a flexible allocation in this band for fixed and mobile (except aeronautical mobile) services. Aeronautical mobile use will be prohibited in order that operations in the 1670-1675 MHz band protect the sensitive radio astronomy receivers in the lower adjacent band. Further, the GOES receive earth stations located at Wallop's Island, Fairbanks and Greenbelt will have co-primary status with non-Federal Government operations in the band. In the *Notice*, we asked for comment regarding appropriate technical rules for this band, especially as it relates to power limits and out-of-band emissions necessary to protect radio astronomy operations in the lower adjacent band.[198] Specific service and licensing rules will be discussed in the companion Service Rule Notice.

65. To protect the Federal Government earth stations located at Wallops Island and Fairbanks that will be co-primary in the band, we will require that licensees planning to operate within 100 kilometers (62.1 miles) of the earth stations at these facilities coordinate such use with the affected earth station prior to construction. This requirement will be added to footnote US362.[199] In addition, we will require licensees planning to operate in the vicinity of the earth station located at Greenbelt to coordinate such use prior to construction. This requirement is consistent with the *First Spectrum Reallocation Report* in which NTIA recommended that, in the absence of coordination guidelines for METSATs, coordination of all ground stations is necessary.[200] Because the Greenbelt facility is used as a back-up for Wallops Island it operates only during tests (about once per month) and in any instance where Wallops Island goes out of service. Due to this sporadic use, different coordination procedures may be needed for this site than for the other two sites. Therefore, we are not adopting specific coordination requirements for the Greenbelt facility here.[201] Instead, coordination requirements will be discussed in the companion Service Rule Notice.

66. As mentioned above, we are mindful of the need to protect radio astronomy and radiosonde operations in the 1660-1670 MHz band. We note, however, that because radio astronomy receivers are much more sensitive than those of radiosondes, any protection schemes designed for radio astronomy receivers should also protect radiosondes. Typically, to accomplish such protection, the Commission has set out-of-band emission limits to restrict the amount of power present in a frequency band due to a transmitter in an adjacent band. We believe that such a requirement is necessary here. However, we are not adopting specific limits in this Report and Order. Instead, issues of maximum power levels and emission masks will be explored in the companion Service Rules Notice. In its comments, ArrayComm states that power spectral flux density limits[202] (PSFD) should be established as coordination criteria for locating stations in the 1670-1675 MHz band near radio astronomy sites. We decline to adopt PSFD limits. We generally have not adopted such limits in the past and believe that they could artificially restrict commercial operations in the band. However, we will encourage future licensees in this band to coordinate mutually agreeable limits with radio astronomers.[203] Finally, we note

[198] *See Notice* at para. 43.

[199] *See* Appendix C, footnote US362.

[200] *See First Spectrum Reallocation Report* at Appendix C.

[201] We note, however, that NTIA has indicated that the coordination zone around the Greenbelt facility will be smaller (65 kilometers) than the zone around the other two stations (100 kilometers). *See NTIA Letter.*

[202] Power spectral flux density is a measure of the strength of a wave over a specified bandwidth. Literally it is the radiated power flux per unit bandwidth per unit area. It is often expressed in Watts/Hz/m^2.

[203] Our action here does not preclude future licensees and radio astronomers from agreeing on PSFD limits as a method of protecting radio astronomy operations.

that the provisions of footnote US74 of the Table of Frequency Allocations will apply to this band.[204] This footnote specifies that radio astronomy operations will be protected from extraband radiation only to the extent that such radiation exceeds the limits for a station operating in compliance with all applicable Commission rules.

4. 2385-2390 MHz Band

67. In ITU Region 2, the 2385-2390 MHz band is allocated to the fixed, mobile, and radiolocation services on a primary basis and to the amateur service on a secondary basis.[205] Domestically, the band is allocated to the mobile service on a primary basis for Federal and non-Federal Government use, limited to aeronautical telemetry and associated telecommand operations for flight testing of aircraft and missiles. All other mobile telemetering uses are secondary to these uses.[206] Currently, DoD, the National Aeronautics and Space Administration (NASA), DOE, and the commercial aviation industry use the entire 2360-2390 MHz band to support aeronautical flight test operations. These operations will continue in the 2360-2385 MHz band. In addition, the 2385-2390 MHz band is allocated to the radiolocation service on a primary basis and to the fixed service on a secondary basis for Federal Government use.[207]

68. The 2385-2390 band will become available for exclusive non-Federal Government use in January 2005. However, NTIA stated that to minimize the operational impact to flight test programs that are ongoing or planned to begin in the near future, Federal Government operations at seventeen sites will continue on a protected basis until 2007.[208] These protection areas, circles with radii ranging from 100 kilometers to 160 kilometers, are scattered around the continental United States, Hawaii, and Puerto Rico, and range from sparsely populated desert areas to major metropolitan areas such as Seattle, Washington and St. Louis, Missouri.[209] In addition, the National Astronomy and Ionosphere Center operates a 1-megawatt planetary research radar at Arecibo, Puerto Rico with a 20 megahertz bandwidth, centered at 2380 MHz. As indicated in the *Second Spectrum Reallocation Report*, airborne and space-to-Earth transmissions will be prohibited in Puerto Rico to protect this facility.[210] Finally, we note that this band was transferred to non-Federal Government use pursuant to BBA-97, and therefore licenses will be assigned in accordance with Section 309(j) of the Communications Act. New licensees must compensate Federal Government entities in advance for marginal costs incurred in relocating their facilities from the band.[211] In a recent Report to Congress, NTIA estimated the reimbursement costs for

[204] *See* 47 C.F.R. § 2.106, footnote US74.

[205] *See* 47 C.F.R. § 2.106

[206] *Id.* at footnote US276.

[207] Federal use of this radiolocation allocation is limited to the military. *Id.* at footnote G2.

[208] *See Second Spectrum Reallocation Report* at 3-46 through 3-49, Table 3-6, and 4-3 through 4-4.

[209] *See First Spectrum Reallocation Report* at 4-3 and Table 3-4.

[210] *See Second Spectrum Reallocation Report* at 4-4.

[211] *Id.* at 4-1.

this band as $124-$219 million dollars with the majority of these costs going towards retuning existing equipment to a band of replacement spectrum.[212]

69. In the *Notice*, we proposed to allocate the 2385-2390 MHz band to the fixed and mobile services on a co-primary basis and to allow flexible use.[213] In addition, we asked for comment on whether we should allocate this band more narrowly. We received few comments regarding our proposals for this band. MicroTrax states that although the 2385-2390 MHz band presents characteristics that allow the band to be a good technical fit for its proposed PLMS,[214] other aspects of the band make it less desirable than the 1670-1675 MHz band.[215] Primarily, Microtrax argues that the requirement to reimburse Federal Government users of this spectrum for relocation costs, are unknown and may be prohibitively expensive as to prevent Microtrax from offering a low-cost consumer service.[216] We believe other entities, such as those interested in the 1670-1675 MHz band, could also make use of the 2385-2390 MHz band. We note that Motorola recently filed an *ex parte* requesting that this band not be included in this proceeding and instead be used to relocate Federal Government users from spectrum under consideration for advanced wireless communications.[217] Under the provisions of the Communications Act, the Commission must reallocate and assign this spectrum for competitive bidding.[218] If NTIA determines that it is in the public interest to retain this spectrum for Federal Government use, it may substitute this spectrum for other spectrum under its authorizing statute.[219]

70. In addition to our proposal to allocate this band for fixed and mobile services, we sought comment on NTIA's determination that receiver and transmitter standards are needed for users of this band in order to reduce the potential for mutual interference with airborne systems that will continue to operate in the adjacent 2360-2385 MHz band.[220] No comments were received regarding this issue. Thus, consistent with rules for most radio services regulated by the Commission, we will not adopt receiver standards for this band. However, in order to attract and retain customers, we believe that equipment manufacturers have sufficient incentive to design robust equipment capable of operating in this band absent specific Commission rules to that effect. We also asked for comment on whether sites in addition to the seventeen sites identified by NTIA for protection until 2007 are currently being used.[221] The Aerospace and Flight Test Radio Coordinating Council (AFTRCC) requests that ten additional sites

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[212] *See* Assessment Of Electromagnetic Spectrum Reallocation, Response to Title X of the National Defense Authorization Act for Fiscal Year 2000, NTIA Special Publication 01-44, Department of Commerce, and January 2001 at 3-39 through 3-43 and 3-47.

[213] *See Notice* at para. 47.

[214] *See* para. 62, *supra*, for a brief description of PLMS.

[215] *See* MicroTrax Comments at 4.

[216] *Id.* at 5-6.

[217] *See* Letter to Magalie Roman Salas, Secretary, FCC from Steve B. Sharkey, Director, Spectrum Standards and Strategy, Motorola, Inc. (Jul. 18, 2001).

[218] See 47 USC § 925(c)(2)

[219] *See* 47 U.S.C. § 924(b)(1).

[220] *See Notice* at para. 45. *See also, Second Spectrum Reallocation Report* at 4-3.

[221] *Id.*

beyond those identified by NTIA receive protection until 2007.[222] They state that this would minimize the impact of reallocation on current and planned flight test operations while they prepare to operate in reduced spectrum.[223]

71. Inasmuch as there was no opposition to our proposal to provide a flexible allocation in this band to the fixed and mobile services, we are adopting this proposal for the 2385-2390 MHz band. As stated in the *Notice*, we would like to minimize the impact on aeronautical telemetry operators from transitioning out of this band. We, therefore, will protect nine of the additional ten sites requested by AFTRCC, but will not extend this protection to the Fairfield County, Connecticut site. In this regard, we are concerned that protecting the Fairfield County site would delay deployment of service to the New York City metropolitan area for at least two years. Because this area is such a large population center, it is important that a licensee have access to this market as soon as possible. We believe that these actions strike a balance between the needs of the aeronautical telemetry community and those of new licensees in the 2385-2390 MHz band. Accordingly, we are modifying proposed footnote USzzz (codified herein as footnote US363) in the Table of Frequency Allocations to include protection for the requested nine sites.

B. Effect of Reallocated Spectrum on Native Americans

72. In the *Notice*, we sought comment from Indian Tribal Governments regarding the effect our proposals for the 27 MHz being addressed in this proceeding might have on Native American Tribes.[224] Last year, the Commission adopted a *Tribal Government Policy Statement*, which stated that the Commission is committed to working with Native American tribes to ensure adequate access to communications services, and consulting with Tribal Governments prior to implementing any regulatory action or policy that would significantly affect tribal Governments, their land, and resources.[225] We did not receive any comments from Tribal Governments or other parties on this issue. However, we will encourage future licensees, when deploying systems in spectrum reallocated in this *Report and Order*, to work with Tribal Governments to serve the communications needs of Tribal communities.

C. Protection of Federal Government Services

73. As discussed above, Federal Government operations will continue on a protected basis in several of the reallocated frequency bands, either indefinitely or for a period of time beyond the date of spectrum transfer from Federal to non-Federal Government use.[226] In the *Notice*, we stated that within the established protection zones, non-Federal Government stations would need to be coordinated with NTIA.[227] This mandatory coordination will be accomplished by the Commission after an application is

[222] AFTRCC is an association of aerospace companies engaged in the design, development, manufacture, and testing of commercial and military aircraft, space vehicles, missiles, and weapon systems. *See* AFTRCC Comments at 4-6 and Exhibit 1. AFTRCC requests protection of 160 kilometer circles around the following sites: Alamosa, Colorado, Albuquerque, New Mexico, Amarillo, Texas, Arlington, Texas, Leadville, Colorado, Thermal, California, Phoenix, Arizona, Marietta, Georgia, Greenville, Texas, and Fairfield County, Connecticut.

[223] *Id.* at 6.

[224] *See Notice* at para. 50.

[225] *See* Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes, FCC 00-207, *Policy Statement*, 16 FCC Rcd 4078 (2001) (*Tribal Government Policy Statement*).

[226] *See* paras.18, 37, 38, 39, 40, 61, and 68, *supra*.

[227] *See Notice* at para. 51.